proteins and peptides. The end hydroxyl groups of PEG reacted with NPC creating an activated OPF. The activated OPF could then be modified with GRGD, a model cell-modulating peptide. The NPC-OPF 1.0K was characterized by NMR (Figure 10). The characteristic proton peaks of 4-nitrophenyl carbonate ranging from 7.4 to 8.4 ppm in the NMR spectrum (Figure 10B) indicate the successful activation of OPF by NPC. The NMR spectrum in Figure 10B also shows that the hydroxyl proton peak of the OPF 1.0K, peak **d**, disappeared and the proton peak of the methylene group attached to 4-nitrophenyl carbonate, peak **e**, appeared at 4.4 ppm after activation. NMR analysis also gives a reaction yield of 91% for OPF 1.0K with NPC. This NPC-OPF 1.0K is available for coupling of proteins and peptides in a buffered solution of pH between 8.0 and 9.0.

[0066] The NMR spectrum of OPF 1.0K modified with GRGD in Figure 11B shows the characteristic proton peaks of GRGD as well as proton peaks of the OPF 1.0K indicating successful modification. The presence of GRGD was confirmed by peaks **a**, **b** and **c** of arginine and aspartic acid. Turning the color of the reaction medium into green during the reaction directly supported the release of 4-nitrophenol by aminolysis. Peak integration of the NMR spectrum gives an 83% yield for the coupling reaction of GRGD with OPF 1.0K.

[0067] The modified OPF 1.0K was also characterized by FT-IR. As shown in Figure 12, the IR spectrum of the OPF 1.0K has the –C=O stretch band of fumarate bonds at 1730 cm^{-1} before activation with NPC. The FT-IR spectrum of the NPC-OPF 1.0K has the –C=O stretch band from 4-nitrophenyl carbonate at 1770 cm^{-1}, the aromatic -NO_2 band at 1530 cm^{-1}, as well as the –C=O stretch band of the fumarate bonds. The bands of NPC disappeared after the GRGD modification. The coupling of GRGD with NPC-OPF 1.0K release 4-nitrophenol as supported by the absence of the 4-nitrophenyl bands in the IR spectrum of OPF modified with GRGD.

Preparation and characterization of a biodegradable polymeric scaffold of PPF and OPF 1.0K modified with GRGD